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**BEFORE THE
SOUTH CAROLINA PUBLIC SERVICE COMMISSION**

**DIRECT TESTIMONY
OF
DR. MARK COOPER**

**ON BEHALF OF FRIENDS OF THE EARTH AND SIERRA CLUB
DOCKET NUMBERS 2017-207-E, 2017-305-E AND 2017-370-E**

12 **I. QUALIFICATIONS**

13
14 **Q. Please state your name and address.**

15 A. My name is Dr. Mark Cooper. I reside at 504 Highgate Terrace, Silver Spring, Maryland.
16

17 **Q. Briefly describe your qualifications.**

18 A. My background is as I described to the South Carolina Public Service Commission (the
19 PSC) in my 2012 testimony in Docket No. 2012-203-E as follows (Direct p. 1):

20 "I have a Ph.D. from Yale University and have been providing economic and policy
21 analysis for energy and telecom for over thirty years. I have been the Director of Energy and the
22 Director of Research at the Consumer Federation of America for 27 years, although the opinions
23 I express in this testimony are my personal opinions and not those of the Consumer Federation. I
24 am a Fellow at various universities on specific issues, including the Institute for Energy and the
25 Environment at Vermont Law School. I have testified over 100 times before public utility
26 commissions in 44 jurisdictions in the U.S. and Canada on energy and telecommunications
27 issues and about twice as many times before federal agencies and Congress on a variety of

issues, including energy and electricity. In the past few years I have testified on nuclear construction cost issues before regulators and legislators at the federal and state levels in the U.S. and Canada and published papers and articles in professional journals.”

“Q. Please describe your activity with respect to electricity economics and resource acquisition.”

“A. One of the first public utility commission proceeding I participated in over a quarter of a century ago involved the prudence and economic viability of Grand Gulf unit 2.¹ The most recent proceeding involved the same issues with respect to the Turkey Point and Levy reactors in Florida.² In the intervening years I have testified about and published numerous articles on nuclear economics,³ natural gas,⁴ energy efficiency,⁵ renewables⁶ and electricity restructuring.⁷

¹ "On Behalf of Mississippi Legal Services Coalition in the Matter of the Citation to Show Cause Why the Mississippi Power and Light Company and Middle South Energy Should not Adhere to the Representation Relied Upon by the Mississippi Public Service Commission in Determining the Need and Economic Justification for Additional Generating Capacity in the Form of A Rehearing on Certification of the Grand Gulf Nuclear Project," Before the Mississippi Public Service Commission, Docket No. U-4387, August 13, 1984

² "Direct Testimony of Dr. Mark N Cooper in Re: Nuclear Plant Cost Recovery for the Southern Alliance for Clear Energy," Before the Florida Public Service Commission, FPSC Docket No. 100009-EI, August 2010; "Direct Testimony of Dr. Mark N cooper in Re: Nuclear Plant Cost Recovery for the Southern Alliance for Clear Energy," Before the Florida Public Service Commission, FPSC Docket No. 090009-EI, July 15, 2009

³ "Economic Advisability of Increasing Loan Guarantees for the Construction of Nuclear Power Plants," *Domestic Policy Subcommittee, Committee on Oversight and Government Reform, U.S. House of Representatives*, April 20, 2010

⁴ "Energy Market Manipulation and Federal Enforcement Regimes," Committee On Commerce, Science And Transportation, United States Senate, June 3, 2008; "Direct Testimony Of Dr. Mark N. Cooper On Behalf Of The Attorney General Of Oklahoma, Before The Oklahoma Corporation Commission Application Of Ernest G. Johnson, Director Of The Public Utility Division, Oklahoma Corporation Commission, To Require Public Service Company of Oklahoma To Inform The Commission Regarding Planning Of Energy Procurement Practices And Risk Management Strategies And For A Determination As To Appropriate Methods To Lessen The Impact Of Energy Price Volatility Upon Consumers, Cause No. Pud 2001-00096, May 18, 2001

⁵ "Building Energy Performance Standards," before the Subcommittee on Energy Regulation of the Committee on Energy and Natural Resources, United States Senate, June 26, 1980; "Prudent Resource Acquisition in a Complex Decision Making Environment: Multidimensional Analysis Highlights the Superiority of Efficiency," *Current Approaches to Integrated Resource Planning, 2011 ACEEE National Conference on Energy Efficiency as a Resource*, Denver, September 26, 2011

⁶ Risk, Uncertainty and Ignorance: Analytic Tools for Least-Cost Strategies to Meet Electricity Needs in a Complex Age, *Variable Renewable Energy and Natural Gas: Two Great Things that Go Together, or Best Not to Mix Them*. NARUC Winter Committee Meetings, Energy Resources, Environment and Gas Committee, February 15, 2011

Exhibit MNC-1 identifies more than two dozen academic and trade press articles, testimony and research reports I have authored in the past decade that bear directly on my testimony in this proceeding.”

Q. Have you continued to analyze these issues since you last testified before the PSC?

A. Yes. In 2017 my analysis of the *Political Economy of Electricity* was published by Praeger and in it I developed many of the arguments I made before the Commission in 2012 about the economics of nuclear reactor construction compared to the alternatives.⁸ In the past six years I have also published over half a dozen articles in academic and trade publications.⁹

Q. Have you done additional analysis since 2012 of the deteriorating economics of nuclear power in South Carolina?

⁷ “Initial Comments of the Consumer Federation of America,” Remedying Undue Discrimination through Open Access Transmission Service and Standard Electricity Market Design, Federal Energy Regulatory Commission, Docket No. RM-01-12-000, October 15, 2002; “An Economic Explanation of Why the West and South Want to Avoid Being Infected by FERC’s SMD and Why Market Monitoring is Not an Effective Cure for the Disease,” SMD Market Metrics Conference, Federal Energy Regulatory Commission, October 2, 2002; “Reply Comments of the Consumer Federation Of America,” before the Federal Energy Regulatory Commission, San Diego Gas & Electric Company, Complaint, v. All Sellers of Energy and Ancillary Services Into Markets Operated by the California Independent System Operator and the California Power Exchange, Docket Nos. EL00-95-000 et al, 2000.

⁸ See pages 13-23 and 80-85, on the technological revolution affecting renewables; Chapters 5 and 11 on resource costs and selection; and Chapter 8 on nuclear.

⁹ “Governing the Global Climate Commons: The Political Economy of State and Local Action, After the U.S. Flip-Flop on the Paris Agreement,” *Energy Policy*, 2018; “Renewable and distributed resources in a post-Paris low carbon future: The key role and political economy of sustainable electricity,” *Energy Research & Social Science*, 2016; “Small modular reactors and the future of nuclear power in the United States,” *Energy Research & Social Science*, 2014; *Energy Efficiency Performance Standards: Driving Consumer and Energy Savings in California*, California Energy Commission’s Energy Academy, February 20, 2014; “Multi-Criteria Portfolio Analysis of Electricity Resources: An Empirical Framework for Valuing Resource in an Increasingly Complex Decision Making Environment”, *Expert Workshop: System Approach to Assessing the Value of Wind Energy to Society*, European Commission Joint Research Centre, Institute for Energy and Transport, Petten, The Netherlands, November 13-14, 2013; “Nuclear Aging: Not so gracefully,” *Bulletin of the Atomic Scientists*, 69, 2013; “Nuclear Safety and Affordable Reactors: Can We Have Both?,” *Bulletin of the Atomic Scientists*, 68, 2012

A. Yes. In 2017, I published a research report explaining *The Failure of the Nuclear Gamble in South Carolina*.¹⁰ In 2018, I revisited and updated many of the issues I raised in South Carolina in a paper entitled *A Clean Slate for Vogtle, Clean Energy for Georgia*.¹¹ In that paper, I compared the economics of Vogtle and Summer and explained why South Carolina had done the right thing in pulling the plug on construction of Summer units 2 & 3.

Q. Have you continued to testify on the issues?

A. Yes. The most recent state proceeding I testified in involved a reactor project in Utah.¹² I have also offered testimony on national policies involving these same issues in the U.S.¹³ and Australia.¹⁴

II. PURPOSE AND OUTLINE OF THE TESTIMONY

Q. What is the purpose of your testimony?

A. I have been asked by Friends of the Earth and Sierra Club to evaluate the appropriate regulatory treatment of costs associated with the abandonment of Summer Units 2 and 3 by South Carolina Electric and Gas Company (SCE&G or the utility) pursuant to the provisions of the South Carolina Baseload Review Act (BLRA) and generally accepted principles of utility

¹⁰ *THE FAILURE OF THE NUCLEAR GAMBLE IN SOUTH CAROLINA*, Dr. Mark Cooper, in support of complaint (Docket 2017-207-E) filed by Friends of the Earth, Sierra Club, July 2017, <https://tinyurl.com/y7e6sfw5> *A Clean Slate for Vogtle, Clean Energy for Georgia*, by Dr. Mark Cooper, for Sierra Club, Feb. 2018, <https://tinyurl.com/y9ntj5pt>

¹² "The Economic Feasibility, Impact on Public Welfare and Financial Prospects for New Nuclear Construction, for Utah Heal," July 2013.

¹³ "Comments of Dr. Mark Cooper." In the Matter of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, Enviro. Protection Agency, RIN 2060-AR33, November 24, 2015.

¹⁴ *Nuclear Power Is an Expensive, Inferior Resource That Has No Place in a Least-Cost, Low-Carbon Portfolio*. Submission to the Electricity Generation from Nuclear Fuels, Nuclear Fuel Cycle Royal Commission, August 3, 2015

1 regulation. It is important to note at the outset that I recommended the project be abandoned as
2 imprudent in my 2012 testimony in Docket No. 2012-203-E

3
4 **Q. Please summarize your basic conclusion.**

5 A. I conclude that the utility has failed to act prudently in proposing and executing the
6 construction of the now abandoned Summer Units 2 & 3. Utility imprudence requires the PSC to
7 disallow all costs incurred since the inception of the project. Information was available to the
8 utility prior to the inception of the project which could have allowed the utility to completely
9 avoid incurring all the subsequently incurred imprudent costs. The decision to “abandon
10 construction of the plant” should have been taken at the very beginning and not some ten (10)
11 later when the utility belatedly chose to abandon the failed project. Recently disclosed evidence
12 of chaos in the management of the reactor construction that began from the earliest days of the
13 project as well as the failure to fully inform regulators including the PSC of those known
14 problems provide independent grounds for protecting ratepayers from imprudently incurred
15 project costs.

16 In short, there are four bases to disallow costs, any one of which, alone, would support
17 the finding of imprudence. Combined they present an overwhelming case for disallowance:

18 Mismanagement of the project,

19 Misrepresentation of the chaos in the construction process,

20 Misunderstanding of the economic reality in the electricity sector, and

21 Misinterpretation of the Baseload Review Act (BRLA).

The utility made decisions to support or continue the project at least three times by signing new and modified agreements and subsequently triggering the abandonment provisions of the BLRA on July 31, 2017:

- the EPC in 2008,
- a new agreement in 2012 and immediately asking for recovery of a cost overrun,
- a fixed cost contract and asking for a cost overrun, and

Each time, they issued a brief economic justification. In every case the economic analysis was fatally flawed. There were six, major, repeated errors that ran through the utility analyses:

- The cost of construction was grossly underestimated,
- Natural gas prices were projected to far above reality,
- Demand growth was projected far beyond real world behavior,
- Efficiency and renewables were never given full consideration as potential resources,
- The company not only assumed a hefty carbon tax (or social cost of carbon) but also assumed that nuclear was the best way to respond to it, and
- Unjustifiable, sunk costs were imposed on the alternatives to boost the case for nuclear.

Correcting any one of these errors would have led a prudent decision maker to forego the nuclear project. All six combine to make an overwhelming case for imprudence. Even when the utility decided to abandon the project, it did not recognize these mistakes, it tried to blame the decision on partner Santee Cooper, which had had the good judgement to pull the plug.

In my 2012 review I examined the costs from the narrow perspective of the Base Load Review Act (BLRA) and the broad perspective of public utility regulation. I concluded that from both points of view that the proposed cost overruns were not prudent, that continued construction was imprudent and that the project should have been abandoned at that time. I concluded that additional costs should not be recovered from SCE&G ratepayers. If the utility had acted

1 prudently and taken my advice, it would have avoided billions of dollars of wasted resources.
2 However, in my 2012 testimony, I was asked to assume that project costs approved by the PSC
3 to that date were assumed to be prudent under the BLRA; and that my assessment of the project
4 focused on the prudence of the ‘going forward’ decision to complete construction versus the
5 prudent alternative of abandonment at that time. Now, however, under the BLRA and accepted
6 regulatory principles the question is more broadly what if any of the abandoned project costs are
7 properly the responsibility of the utility’s ratepayers as opposed to the company and its
8 stockholders.

9 Given my 2012 recommendation, it is abundantly clear that all of the costs incurred since
10 that date are imprudent. The recent revelation about the remarkably wasteful and chaotic state of
11 the project even prior to that date and the belated abandonment of the project raise additional
12 considerations that drive the finding of imprudence even farther back in the history of the
13 project. I noted in my 2012 testimony a number of issues that made the decision to begin the
14 project imprudent and the recent evidence of early and continued chaos in the project reinforces
15 the conclusion that the decision to undertake the project was imprudent.

16
17 **Q. Was 2012 the first time your clients cautioned the PSC and the utility about the**
18 **dangers of undertaking this project?**

19 A. No. In fact, in 2008 Nancy Brockway testified for Friends of the Earth before the PSC in
20 the initial BLRA Combined Application proceeding.¹⁵ Citing information generally known at
21 the time she urged rejection of the nuclear project as imprudent compared to less costly

¹⁵ “Direct Testimony of Nancy Brockway,” *In Re: Combined Application of South Carolina Electric and Gas Company for a Certificate of Environmental Compatibility and Public Convenience and Necessity and for A Base Load Order for the Construction and Operation of a Nuclear Facility at Jenkinsville South Carolina*, Docket No. 2008-196-E, October 17, 2008.

1 alternatives. At roughly the same time I began a series of reports that described the likely causes
2 of the inevitable failure of the so-called “nuclear renaissance” and nuclear reactor construction in
3 the U.S.

4
5 **Q. Please provide an outline of your testimony.**

6 A. Recent revelations about the chaotic management of the project from the earliest days of
7 construction confirm and document the validity of the problems in the project identified in my
8 2012 analysis. Because the timing of what the utility knew or should have known and did or
9 should have done to control costs has become so important and because there is now a very clear
10 disconnect between what the PSC was told along the way and what the reality was, I begin by
11 including excerpts from my 2012 testimony. In each section of the testimony I restate, as
12 appropriate, what I said in 2012 as the basic approach to the analysis. It all fits and I see no need
13 to change it. I then update the analysis in terms of the implications of recent developments and
14 show that these reinforce what I said six years ago.

15 I begin in the next section, Section III, by providing a general discussion of imprudent
16 and abandonment costs. I state the general nature and function of prudence review in the utility
17 sector. I then discuss how that view fits with the BLRA. Next, I offer my analysis of the
18 implications of specific statutory language for recovery of imprudent and abandonment costs in
19 South Carolina under the BLRA and subsequent legislation.

20 Section IV puts the recent revelations of mismanagement and chaos at the construction
21 site in the context of my earlier analysis. Simply put, there was a great deal of analysis from
22 independent experts that identified and even predicted the problems that we now know the utility
23 confronted and failed to deal with effectively from day one.

1 Section V reviews the overwhelming evidence that nuclear power is not only not the least
2 cost option, it is in many respects the highest cost option.

4 **III. IMPRUDENCE AND ABANDONMENT**

5 **A. The Consumer Protection Fundamentals of Utility Regulation**

7 **Q. What are the broad principles of utility ratemaking that you believe still apply?**

8 A. As I explain in my 2012 testimony, the constant review of the prudence of projects is
9 exactly what happens in a competitive marketplace. As I noted in 2012, (Direct, p.4):

10 “In a competitive market, when a firm finds that a project is no longer economic, it must
11 abandon that project because it will not be able to recover the costs. Firms must make decisions
12 on a forward looking basis, regardless of sunk costs.

13 “Emulating the competitive market, the utility should be constantly evaluating the
14 economic prudence of its past investment decisions. The fact that economic analyses conducted
15 between four and seven years ago concluded that the Summer 2 and 3 reactors were the least-
16 cost options does not mean they are the least-cost options today. Because market fundamentals
17 have shifted dramatically against the economics of nuclear power, it is now far from the least-
18 cost alternative. The utility should conclude that the project should be halted and the future
19 needs of SCE&G ratepayers should be met with lower-cost alternatives.”

21 **“Q. Why are utility rates regulated?”**

22 A. As I said in my 2012 testimony (Direct, pp. 8): “Because electric utility service has long
23 been viewed as a natural monopoly, it has been delivered to consumers in areas where utilities

1 are given franchises as the monopoly service provider. The rates, terms and conditions of
2 service are regulated, as are many of the investment decisions, since the delivery of service to
3 consumers is not a competitive activity. Since there is a monopoly provider, consumers must be
4 protected from the natural tendency of service providers to charge whatever the market will bear
5 or provide poor service. Thus, public utility ratemaking is fundamentally consumer protection
6 and it is constructed to give consumers the same protections that a competitive market would. In
7 order to understand how advanced cost recovery affects the process of consumer protection it is
8 necessary to review several of the key principles of consumer protection that guide public utility
9 commissions.”

10
11 **“Q. Why are the concepts of used and useful important to utility regulation?”**

12 “A. In traditional utility rate making, the utility makes all the investment in the plant
13 necessary to bring it on line with shareholder resources. When the plant is ready to go on line,
14 the utility seeks to put it into rate base. Only when the plant is ready to deliver electricity is it
15 considered to be “used and useful” to the captive customers of the utility. In a general rate case,
16 the utility will seek to charge ratepayer for the sum it has invested in the plant, as well as recover
17 the operating (variable) costs of generating power. The sum invested is also allowed to earn a
18 return on capital during the construction phase, which is typically entered into a separate account
19 (allowance for funds used during construction, AFUDC). The rates charged to consumers also
20 include depreciation of the plant as it produces electricity, which returns the capital investment
21 to the utility. Thus, the utility gets a return of and on its capital while the plant is operating.”

22 This “used and useful” principle is embodied in the BLRA itself where the statute
23 recognizes, but limits, the advance cost recovery to circumstances where the utility is actively

1 constructing the plant in accordance with the construction budget and schedule approved by the
2 Commission:

3 (C) So long as the plant is constructed or being constructed in accordance with the
4 approved schedules, estimates, and projections set forth in Section 58-33-270(B)(1)
5 and 58-33-270(B)(2), as adjusted by the inflation indices set forth in Section
6 58-33-270(B)(5), the utility must be allowed to recover its capital costs related to the
7 plant through revised rate filings or general rate proceedings.

8
9 S.C. Code Section 58-33-275(C).

10
11 The corollary to this BLRA bargain is presented here by the utility's abandonment of the project:
12 it no longer is entitled to assured cost recovery for a useless and failed investment.

13
14 **“Q. What role does the obligation that rates be just, reasonable and prudent play in**
15 **utility regulation?”**

16 A. As I said in my Direct testimony (pp. 9-11): “The task of public utility commissions is
17 generally to ensure that the utility delivers the least-cost power, subject to the need for reliability
18 (and other) considerations, since that would be the outcome in the marketplace. Competition
19 drives the least-cost, most efficient technology to the consumer. Emulating a competitive
20 market, the public utility commission will consider whether the costs the utility seeks to recover
21 from ratepayers are ‘just, reasonable and prudent.’ The commission oversees the decision about
22 which technologies to use and which costs utilities are allowed to recover. Even where the
23 construction of new facilities takes place within the parameters of an Integrated Resource Plan,
24 which is a long-term energy plan, the fact that the utility has been told or allowed to build a
25 certain type of plant does not alter the fact that the costs cannot be recovered from ratepayers
26 until the plant is used and useful and the cost (including the return on investment) are found to be
27 just, reasonable and prudent.”

1 “These two principles of utility regulation protect consumers from different potential
2 abuses. Used and useful ensures that ratepayers receive service in exchange for the recovery of
3 costs, while just reasonable and prudent ensure that the costs recovered are not excessive. If
4 projects are cancelled or abandoned they do not become used and useful and their costs would
5 not normally be recovered in the marketplace (except if all sellers suffer similar problems, in
6 which case all sellers in the market will put their prices up to cover the costs). However, utilities
7 may recover the costs associated with abandoned projects, if they can show that the decision to
8 commence the project was prudent and the causes of the termination of the project were not
9 imprudence on the part of the utility.

10 “This pattern of cost recovery reflects what would happen in a competitive market, which
11 is why it is used as a ratemaking standard. When a product is sold to the consumer, the
12 consumer has the immediate use of the product and the price includes only a normal return on
13 investment (if the market is competitive). Suppliers who are inefficient and have costs above the
14 market price or who try to earn supra normal profits by setting prices above costs, will not be
15 able to recover those excess costs from consumers. Consumers would not purchase the
16 overpriced products because they would have lower cost options in the market place. The
17 supplier’s inefficiency will come out of the supplier’s pocket in the form of a lower rate of return
18 earned on the investment. These principles balance the interest of utility stockholders, who
19 receive a fair rate of return, and ratepayers, who receive useful products at reasonable prices.”

20 When I observed in 2012 that advanced cost recovery under the BLRA distorted the
21 utility’s incentives in an inefficient and costly manner favoring expensive and risky nuclear
22 technology, I hardly expected the disastrous result confronting ratepayers, regulators and the
23 utility today. Despite my characterization of the perverse potential for cost recovery in the event

of project cancellation, traditional regulatory principles, as well as the specific abandonment provisions of the BLRA, impose a disciplined prudence review of both the abandonment decision and the project costs incurred.

Q. Are you familiar with the definitions of the terms “prudence” and “imprudence” as employed by the parties and regulators in the proceedings involving this nuclear project?

A. Yes. The BLRA itself fails to provide any definitions of the terms “prudence” or “imprudence,” despite those terms’ central operative role in Commission approval of baseload projects, in its review and approval of project cost overruns and, finally, as here, in reviewing and disallowing costs incurred upon project abandonment. The South Carolina General Assembly has recently remedied these omissions by an amendment to the BLRA clarifying the definition of these critical terms:

SECTION 1. Section [58-33-220](#) of the 1976 Code is amended by adding appropriately numbered items to read:

"() 'Imprudent' or 'imprudence' includes, but is not limited to, lack of caution, care, or diligence as determined by the commission in regard to any action or decision taken by the utility or one acting on its behalf including, but not limited to, its officers, board, agents, employees, contractors, subcontractors, consultants affecting the project, or any other person acting on behalf of or for the utility affecting the project. Imprudent or imprudence includes, but does not require, a finding of negligence, carelessness, or recklessness.

Imprudence on behalf of any contractor, subcontractor, agent, or person hired to construct a plant or perform any action or service on behalf of the utility shall be attributed to the utility.

() 'Prudent', 'prudence', or 'prudency' means a high standard of caution, care, and diligence in regard to any action or decision taken by the utility or one acting on its behalf including, but not limited to, its officers, board, agents, employees, contractors, subcontractors, consultants affecting the project, or any other person acting on behalf of or for the utility affecting the project.

To the extent a utility enters a contract with a third party that delegates some or all decision-making authority related to the project, the utility retains the burden of establishing the prudency of specific items of cost or specific third-party decisions.

1 'Prudent', 'prudence', or 'prudency' also requires that any action or decision be made in a
2 timely manner.

3
4 In determining whether any action or decision was prudent, the commission shall
5 consider, including, but not limited to:

6
7 (a) whether the utility acts in a timely manner, with any passage of time which results
8 in increased costs or expense prior to the utility acting or making the decision weighing
9 against a finding of prudency;

10
11 (b) whether prior actions or decisions by the utility were imprudent and such imprudent
12 actions led to a decision by the utility that could otherwise be prudent. Such
13 circumstances weigh against a finding of prudency; and

14
15 (c) any other relevant factors, including commission of a fraudulent act, which are
16 deemed not to be prudent.

17
18 As used in item (c), 'fraud' includes, in addition to its normal legal connotation,
19 concealment, omission, misrepresentation, or
20 nondisclosure of a material fact in any proceeding or filing before the commission or
21 Office of Regulatory Staff. Proceedings and filings to which the provisions of this
22 paragraph apply include, but are not limited to, rate or revised rate filings, responsive
23 filings, motions, pleadings, briefs, memoranda, document requests, and other
24 communications before the commission or Office of Regulatory Staff."

25
26
27 Act 258, effective June 28, 2018.

28 In my opinion these recently adopted statutory definitions of prudence and imprudence
29 are wholly consistent with the generally accepted understanding and use of those terms by
30 experts in the field of utility regulation as well as by regulators as applied to the review and
31 regulatory treatment of costs associated with the construction of new utility generating facilities.
32 The concept of utility prudence is generally understood to impose a "high standard of caution,
33 care, and diligence" in the management of a complex project, including the utility's supervision
34 and oversight of its contractors engaged in the engineering and construction of a project.
35 Imprudence, by contrast, is generally understood as a "lack of caution, care, or diligence," by a
36 utility. It is also generally understood that the utility has a duty of honesty, and disclosure to
37 regulators, including ORS and the Commission, of material facts regarding the project, to
38 exclude as imprudent acts of fraud, including "concealment, omission, misrepresentation, or

1 nondisclosure of a material fact.” None of the elements of the recently clarified definitions of
2 prudence and imprudence depart from the generally accepted use of those terms in the field of
3 utility regulation.

4 Moreover, I understand that the utility itself has endorsed these principles in defining the
5 same terms, prudence and imprudence, in the context of reviewing costs incurred in the
6 construction of a nuclear generating facility. In the judicial review of the Commission’s 2012
7 cost overrun case, all parties agreed that the opinion of the Georgia appeals court set forth the
8 accepted definition of the terms, ironically, in the context of reviewing cost overruns in the
9 1980’s construction of the first Unit 1 at the Plant Vogtle nuclear generating station.

10 The prudence standard was further defined by the PSC:

11
12 The standard by which management action is to be judged is that of reasonableness under
13 the circumstances, given what was known or should have been known at the time the
14 decision was made or the action was taken. The concept of prudence implies a
15 standard or duty of care owed to others. In building a nuclear power plant, the Nuclear
16 Regulatory Commission requires the utility to exercise a high standard of care in order to
17 protect the public health and safety. Similarly, given the costs involved and the rate
18 impact of those costs on monopoly customers, this commission finds that the utility
19 should be held to a high standard of care in making decisions and taking actions in its
20 planning and constructing such a project. Thus, while the standard to be applied is
21 reasonableness under the circumstances, where the risk of harm to the public and
22 ratepayer is greater, the standard of care expected from the reasonable person is
23 higher. Given this standard ..., a reasonable person is one who is qualified by education,
24 training and experience to make the decision or take the action, using information
25 available and applying logical reasoning processes.

26
27 Georgia Power Co. v. Georgia Public Service Comm’n, 196 Ga. App. 572, 396 S.E.2d
28 562 (1990).

29 Thus, the imposition of a “high standard of care” on utility management in the “planning
30 and construction” of a nuclear power plant is beyond dispute. The fact that ratepayers are the
31 captives of a monopoly in which the utility is the driving force, places the burden on the utility.
32 This is particularly the case in disputes between the utility and vendors. Under certain

1 circumstances, according to this ruling, the captive status of customers might even make it
2 possible to not allow the recovery of prudently incurred costs.

3 To the extent that prudence review applies under the BLRA, the principles are clear. The
4 BLRA legislation created a piecemeal process that gave the utility more assurance about early
5 cost recovery, but did not abandon the overarching principles of prudence review for evaluating
6 expenditures that were made in the delivery of an operating reactor. For projects that were
7 abandoned, this traditional view of prudence was even more evident, as discussed in the next
8 section.

10 **IV. THE HISTORY OF RATESETTING UNDER THE BLRA**

11 **“Q. Please describe the history of rate setting for this project under the BLRA that**
12 **brought it to this point.”**

13 A. As I said in my 2012 testimony (Direct, pp. 3-4): “While the BLRA represented a
14 dramatic change in the way rates are set for new nuclear reactors built in South Carolina, it did
15 not abandon the fundamental concepts of just, reasonable and prudent that govern the setting of
16 rates. Advanced cost recovery under the BLRA gives nuclear costs very special treatment, but it
17 is not a blank check and it does not diminish the obligation of the utility to ensure that it delivers
18 the least-cost electricity to ratepayers.”

19 “This cost overrun proceeding signals to the commission that the utility has failed to
20 continue to practice the cost vigilance it is obligated to exercise. When the contingency cost
21 pool that the utility proposed in the initial BLRA proceeding was rejected by the South Carolina
22 Supreme Court, the utility quickly updated its cost estimate. It took a second bite at the apple
23 and chose to increase its cost estimate by \$174 million to establish a cost basis of \$4.3 billion.

1 “A mere two years later, it is back asking for another \$283 million, a cost increase of 6.6
2 percent. With this request, the cost overruns have now driven the total cost of the project above
3 the original cost estimate plus the contingency cost pool. The BLRA requires a prudence review
4 of the increase in costs and this is the moment for a thorough review of the cost and economic
5 viability of the project.”

6 Since my 2012 testimony the rate of project cost-overrun ‘bleeding,’ driven by the
7 utility’s and its vendors’ imprudence, has only accelerated. The Commission approved \$131.6
8 million in cost overruns after the 2012 proceeding. In 2015 the cost overruns reached \$698.2
9 million; and in 2016, when the project’s terminally imprudent status was yet more evident to the
10 utility, it procured a Commission approval for a staggering construction budget increase of
11 \$831.3 million, premised on the foolish claim that pouring millions of additional dollars into
12 Westinghouse’s near-bankrupt coffers would remedy the project’s mortal wounds. The questions
13 of what utility management knew of the project’s imprudence and when they knew it; as well as
14 the significance of material information withheld from regulators will be hotly litigated in this
15 proceeding. Suffice it to say, my testimony here rests primarily on the analysis I conducted in
16 2012, arguing for the imprudence of going forward with the project, merely extended back to the
17 point of the project’s inception. Emerging evidence of internal utility awareness of imprudence
18 will confirm my analysis and supply additional bases for providing relief for ratepayers.

19 I return now to my 2012 testimony.
20

21 **“Q. Are the cost increases prudent from the narrow view of the BLRA?”**

22 **“A.** No, they are not. I show in my testimony that there are numerous ways in which the
23 costs the utility now seeks to recover from ratepayers should have been anticipated in the

original cost estimate, but were not or have been caused by actions of the utility or its vendors. Ratepayer should not be forced to bear the burden of these actions. In addition, there is an even more fundamental reason that these costs should not be recovered from ratepayers – the overall project is no longer prudent. Although the BLRA gave nuclear reactor construction special treatment in the cost review process, it did not alter the underlying principles that allow recovery of only just, reasonable and prudent cost. The obligation that a project be prudent is continuous, not a one-shot determination. When economic conditions change projects that have become economically unattractive should be abandoned.”

“Q. Does this general view of advanced cost recovery fit the South Carolina Base Load Review Act?”

A. As I further elaborated in my 2012 testimony (pp. 11-13): “Yes, it does. On the one hand, the BLRA gave strong incentives for the utility to choose to build nuclear reactors to meet the future need for electricity. The statute gave a utility investing a new nuclear reactor a remarkably good deal: advanced cost recovery, no challenge of individual cost elements as imprudent, guaranteed cost recovery as long as the utility adhered to the construction schedule and cost estimates, flexible scheduling contingencies, an automatic rate of inflation; the choice of advanced cost recovery or normal utility cost recovery; the full commission approved rate of return, even though substantial risk had been transferred to ratepayers through all of the above mechanisms; and allocation of recovery of costs of a base load facility according to peak load demand.”

“On the other hand, the BLRA did not alter the definitions of just, reasonable and prudent. The initial decision to build a reactor with advanced cost recovery is subject to the

1 traditional principles that require the costs associated with the project to be just, reasonable and
2 prudent, even though that decision was before the reactor became used and useful. The BLRA
3 required cost increases above the initial level approved to also be subject to full prudence
4 review.”

5
6 **“Q. Are you asking the Commission to change its approach to the implementation of the**
7 **just, reasonable and prudent principles?”**

8 “A. Not at all. The suspension of the used and useful standard for these specific investments
9 introduces distortions into utility decision making that highlight the importance of the just,
10 reasonable and prudent principles for ratemaking. I am only suggesting that it rigorously apply
11 the existing standards when it has the opportunity to do so. The BLRA review of cost overruns is
12 an important opportunity.”

13 “Having opened the door to a prudence review by seeking to recover cost overruns from
14 ratepayers, I believe the underlying statute also requires that the cost overrun be considered in
15 the broader context of the overall project. I am not suggesting that the commission look back to
16 disallow any costs that have already been deemed prudent by the initial ruling, but to ask
17 whether further costs should be incurred. The statute allows all costs that have been approved to
18 be recovered, but that does not stop the utility for deciding not to incur additional costs, if the
19 project is no longer the least-cost alternative, nor does it preclude the Commission from
20 examining the new, higher cost of the total project as part of its prudence review of the
21 incremental cost overruns.”

22
23 **“Q. How does the BLRA affect the analysis that must be done?”**

1 “A. Under the BLRA, costs that have been incurred must be recovered by the utility, but if
2 the future costs are no longer prudent, the utility should say so, and the Commission should find
3 as much. The utility should be required to do the proper economic analysis in this and every
4 proceeding in which it seeks to recover costs in excess of the original estimate.”

5 “Because the BLRA has guaranteed the recovery of previous costs incurred, the relative
6 costs of future alternatives requires SCE&G and the Commission to compare the total cost of the
7 nuclear project to the costs of alternatives, plus the costs that have been sunk into the nuclear
8 reactor. This approach to project review (modified by the special treatment of sunk nuclear
9 costs) rests on the fundamental economics of market behavior, which provides the basis for the
10 broad principles of utility regulation. I believe it is consistent with the law in South Carolina as I
11 read it. Legal counsel has indicated to me that he agrees with this view.”

12 The above discussion shows the continuing importance of prudence review and the fact
13 that the PSC must make piecemeal decisions about the recovery of costs prior to the project
14 being used and useful magnifies the importance of prudence review. In a sense, the piecemeal
15 recovery of costs places greater emphasis on the decision making along the way. Here is where
16 the failure of the utility to reflect the utter chaos in and mismanagement of the project takes on
17 special importance. We now know that the “happy face” the utility showed to the PSC and the
18 public was a façade put on for the early “piecemeal” cost overrun approval process that must
19 now be revisited since the project has been abandoned and can never be “used and useful” in
20 providing utility service.

21
22 **Q. Are you suggesting that the BLRA did nothing?**

1 A. Not at all. On the contrary, it made two very important changes, but not the one the
2 utility seems to think it did. It established piecemeal prudence review, which allows the utility to
3 recover costs before the overall project is used and useful. The approval of budget estimates and
4 schedules that would trigger cost recovery is important, but the expenditures were not
5 guaranteed; they are still subject to prudence review. Almost from the outset, the utility never
6 adhered to the cost estimate or the delivery schedule. That alone put the “guaranteed” cost
7 recovery under the statute into doubt. The failure of the utility to fully inform the PSC of the
8 extent of chaos and mismanagement, from the earliest days of construction, cast even greater
9 doubt on the “guarantee” the utility mistakenly thought it had.

10 It is important to note here that the 2012 testimony took the past cost recovery decisions
11 as given and showed that continuing to spend money on the project was imprudent. While the
12 principles remain constant, the change in conditions, revelation of utility failure to disclose
13 important facts and conditions and the abandonment of the project, shift the focus. We now have
14 evidence that the past expenditures themselves were imprudently managed and executed, which
15 opens the door to much closer scrutiny, as does the abandonment decision.

16
17 **Q. Did you emphasize this point in your 2012 testimony?**

18 A. Yes, I did when I analyzed the allocation of risk in the initial cost overruns. The
19 distinction between authorizing expenditures first, but requiring a prudence review second was
20 clear, as was my conclusion that the utility was attempting, erroneously and unfairly, to shield
21 stockholders from any of the burden of cost overruns. I put it as follows (Direct, pp. 20-21):

22 “The company has shouldered none of the risks. The company points out that it
23 negotiated the vendors claim for additional costs down. Compared to the costs that the utility

has asked ratepayers to cover, the utility has asked for ratepayers to pick up six-sevenths of the total cost overruns. The utility has shouldered none of the costs.

	Change	Owner	Transmission	Total
	Orders	Cost		
Vendor	\$76	0	0	76
Ratepayers	\$144	276	21	441
Owner	\$0	0	0	0

Allocation of risk (Marsh, p.19)

“As my discussion of the role of prudence review makes clear, producers are likely to bear some or all of the risk of cost overruns in competitive markets, unless all of the competitors make the same decisions and none pursues a lower cost approach, which is highly unlikely. Given that the utility is guaranteed a full rate of return in advance, allowing it to avoid any share of the cost overruns insulates it from the risks that ratepayers and even the vendors are bearing.”

Q. Did this cost recovery in 2012 reflect the dire straits into which the project had sailed?

A. Not at all. Coming at the moment of the first major cost overruns and showing that the utility was going to protect its stockholders at all costs, while shifting the burden primarily onto ratepayers, this was a key moment to reject the prudence of cost overruns. It turns out that the heart of the project had fallen into disarray, but the direness of the problem was never conveyed to the PSC. We now have a solid account of how bad things were in the press, which was later corroborated by “official” documents, and from which the project never recovered, which is

1 summarized in Exhibit MNC-2. This was the moment that the project should have been
2 abandoned.

3 The problems in the early days of the project were described in a November 1, 2017
4 article in Engineering News-Record entitled “Witness to the Origins of a Huge Nuclear
5 Construction Flop.” The article reports the perspective of a senior manager of nuclear
6 procurement quality assurance,¹⁶ who ended up at Bechtel after his difficult period on the
7 project. Looking at the Westinghouse bankruptcy, it reached a dramatic conclusion about “the
8 traumatic infancy of a slow-developing disaster” and its impact on the “nuclear renaissance.

9 If historians examine why the nuclear renaissance fizzled, they could cite Westinghouse’s
10 promise that AP1000 reactors needed “a short, 36-month construction schedule” from
11 first concrete to core load. Or they could note that Shaw was unprepared for what it faced
12 from its partner Westinghouse and the nuclear construction industry. The glittering
13 promise that modular design would erase much of the risk of nuclear construction turned
14 out to be just that, a glittering promise. The V.C. Summer and Plant Vogtle
15 projects, instead of forming the basis of a nuclear renaissance, delivered a body blow to
16 U.S. nuclear construction as devastating as any of the disastrous nuclear projects that are
17 already in the history books.¹⁷

18
19 Ironically, this observation on the “flop” of the so-called “nuclear renaissance” bears a
20 striking resemblance to an article in *Forbes* magazine published just over three decades earlier.
21 With the word “Fiasco” emblazoned on the cover of a February 1985 edition, *Forbes* magazine
22 painted an eye-catching picture of the failure of nuclear power, in America:

23 The failure of the U.S. nuclear power program ranks as the largest managerial disaster in
24 business history, a disaster on a monumental scale. The utility industry has already
25 invested \$125 billion in nuclear power, with an additional \$140 billion to come before the
26 decade is out, and only the blind, or the biased, can now think that most of the money has
27 been well spent. It is a defeat for the U.S. consumer and for the competitiveness of U.S.

¹⁶ For 14 tumultuous months, from late 2009 to 2011, Hartz worked for Shaw Nuclear Services, the main subcontractor to Westinghouse on its new Georgia and South Carolina reactor projects. With the South Carolina project now canceled and the Georgia project billions of dollars over budget and years late, Hartz’s account of what he saw and experienced in Shaw Nuclear’s Charlotte, N.C., office provides a new channel for understanding the traumatic infancy of a slow-developing disaster.

¹⁷ Richard Korman, “Witness to the Origins of a Huge Nuclear Construction Flop: An inside account from 2010 of events that led to the Westinghouse bankruptcy,” *Engineering News-Record*, November 1, 2017.

1 industry, for the utilities that undertook the program and for the private enterprise system
2 that made it possible.¹⁸

3
4 History had repeated itself. In fact, in America this history of failure is the only history
5 that nuclear reactor construction had and this was the moment to escape from a repetition of the
6 mistakes of the past that would inevitably cost ratepayer tens of billions of dollars.

7 The article outlined a dramatic failure at the core of what was supposed to be a new
8 approach to standardization and modularization of components that was supposed to reduce
9 construction times dramatically. Of equal, if not greater, importance, for the analysis of
10 imprudence, it revealed two key facts that call into question prior findings of prudence. First, it
11 appears that the severe problems were never fully conveyed to the Commission, as the articles
12 cited in Exhibit MNC-2 noted. Second, there was a concerted effort to gloss over the severity of
13 the problems. The official documents exchanged between the vendor and the utility reflected
14 much more severe problems than the official statement given to the public and the PSC. As the
15 article noted:

16 Even after Hartz's team had stopped work at Lake Charles in 2010 and the NRC had
17 sought to clamp down on what it saw as Shaw's lax quality control in its design-change
18 process with Westinghouse, Westinghouse and the utilities reported optimistically about
19 progress at the two projects. For example, at an American Society of Mechanical
20 Engineers seminar in June 2011, Westinghouse's module fabrication manager presented a
21 slide show that lauded all the design's benefits but made no mention of the developing
22 problems. The seminar was titled "Blueprint for a Nuclear Renaissance."¹⁹

23
24 We have already noted the pressure to put on a happy face in the exchange of letters
25 between SCE&G and Westinghouse four year later, so there is a pattern that may well deserve to
26 be described as a cover-up. But that is not the worst of it. With evidence of "pressure" to put on
27 a happy face, in spite of the huge problems coming from the vendor, in 2010, 2014, to which the
28 utility apparently agreed, and the striking evidence of pressure coming from the utility to tone

¹⁸ James Cook, James, "Nuclear Follies," *Forbes*, February 11, 1985

¹⁹ Korman, "Witness to the Origins of a Huge Nuclear Construction Flop"

down or eliminate criticism from its own auditor (i.e. scrubbing the Bechtel report), we see a clear and consistent pattern of willful misreporting, nothing short of a cover up.²⁰

This material identified well over a dozen issues that were later corroborated in confidential letters and audits of the project:

- A rush to start in the face of a steep learning curve in pursuit of “an airy fantasy,”
- Lack of personnel and upheaval in senior management,
- Lack of a final design,
- Lack of quality control,
- Laborious change management process due to lack of onsite authority,
- Toxic relations between members of the construction consortium,
- Failure of the module production process,
- An angry, hostile reaction from the vendor, rather than acceptance of responsibility,
- Pressure to approve production and downplay problems,
- Downplaying importance of rules and qualifications,
- Failure to inform the NRC,
- Cancellation of NRC inspection due to chaos at the site,
- Failure of NRC inspection,
- NRC failure to provide close regulatory oversight, and
- Shutdown of the fabrication, missed deadlines for delivery and project delay.

Exhibit MNC-3 provides the citations for these problems as well as corroboration in official documents that were later revealed.

Q. Isn't this just the play-out of the risks the utility identified in its original application?

A. Not by any stretch of the imagination. It is one thing to name risks, but quite another to assess their probabilities and respond to them when things go bad. The utility underestimated some risks at the outset by failing to acknowledge the history of nuclear power and the challenge

²⁰ E-mail from Michael Crosby, to Lonnie Carter, October 14, 2015. The Bechtel Project Assessment Report was provided for Governor Henry McMaster pursuant to S.C. Cosnt. Art IV. Sec. 17, and S.C. Code Ann. 1-3-10. MNC-8

1 of building a first-of-a-kind plant. It mischaracterized others and never responded to any of the
2 risks in a prudent manner.

3 The complaint about the misestimation of risk is deeply embedded in the project. In
4 2008, Nancy Brockway testified before the PSC in the initial Combined Application
5 proceeding.²¹ At roughly the same time I began a series of reports that described the likely
6 causes of the inevitable failure of the so-called “nuclear renaissance” and nuclear reactor
7 construction in the U.S. In my 2012 testimony I pointed out several ways in which the utility
8 had misrepresented and misunderstood risk. The concerns raised by that first Friends of the
9 Earth witness are similar the concerns I raised in 2012 and they remain at the center of the
10 review of imprudent and abandonment costs. The company emphasizes that it identified a long
11 list of such risks. Having the list is one thing, responding to it is quite another.

12 If we review the list of risk factors that the utility identified in its application, provided in
13 Exhibit MNC-4, we find a number of key risks that the utility failed to deal with. I have
14 organized the observations according to the six categories of risk I have used to evaluate nuclear
15 reactor construction. Several things are striking in Exhibit MNC-4. First, every one of the risks
16 that were under the control of the utility to some extent went wrong. The only two categories
17 that did not go wrong were weather/extremist events, which were not present and the inability to
18 operate the plant, which was never put to the test. One can argue that regulatory risk was minor
19 in the sense that the regulator was supportive, but the company’s behavior was so incompetent
20 that even a friendly regulator had to take actions to maintain its credibility.

²¹ “Direct Testimony of Nancy Brockway,” *In Re: Combined Application of South Carolina Electric and Gas Company for a Certificate of Environmental Compatibility and Public Convenience and Necessity and for A Base Load Order for the Construction and Operation of a Nuclear Facility at Jenkinsville South Carolina*, Docket No. 2008-196-E, October 17, 2008.

1 Second, the list includes only factors associated with the construction and operation of
2 the reactors. All of the risks that were purportedly under the control of the utility: engineering,
3 procurement, construction, even financing (evidenced by the need to raise increasing sums of
4 money over which it is now being sued) went very wrong and the utility never got a handle on
5 any of them.

6 Third, a list of possible things that could go wrong from the point of view of utility
7 management is one thing, but for all of them to go wrong at the same time and none of them to
8 be significantly corrected, is quite another. It is imprudent in the extreme to push ahead with a
9 project that is going so badly on every front.

10 Fourth, it ignores other risks, like marketplace risk, technology risk and policy risk.
11 These, too, must be part of the decision-making process. In a competitive market, the fact that a
12 firm can produce something at a given cost is only half the battle. It has to be able to sell the
13 product when confronted by conditions in the market (marketplace risk) and the actions of its
14 competitors (technology risk), within the terrain that policy (risk) sets for the market.

15 It turns out that not only did every bet the company made against these risks go bad, but
16 they went bad much sooner and much bigger than the information provided by the company to
17 the PSC indicated. Moreover, it became clear quickly that the utility had seriously
18 underestimated the execution risk, as the dispute between Westinghouse and the utility suggests.

19 As the project went bad and the utility began to complain, Westinghouse reminded the
20 utility that it was undertaking a “first-of-a-kind” project and risks would be severe.

21 A Charleston Post and Courier article reported on March 5, 2018 that “SCANA and
22 Santee Cooper knew what they signed up for when they agreed to pay for the first-of-a-kind
23 reactors...The two utilities knew that Westinghouse did not have a finished design when they

1 inked a deal in 2008...They understood Westinghouse was finishing the design when
 2 construction began in 2012. Everyone understood...that a large number of engineering changes
 3 might be “a normal part of the construction process”...But Westinghouse had a request: The
 4 companies needed to keep the fight out of public view. If they didn’t, it would have a ‘decidedly
 5 negative effect on everyone involved in the project...” Therefore, the utility “had to go along”
 6 with the associated cost overruns. The article goes on to state:

7 The newly released communications highlight the high level of angst just months into the
 8 lengthy project...The problems that plagued the reactor from the start led to
 9 Westinghouse going bankrupt and doomed the \$9 billion project....
 10 While the utilities privately bickered with the contractor, customers paid more than \$2
 11 billion for reactors that will never churn a kilowatt of electricity.
 12 SCANA’s executives had earlier assured Wall Street investors that the project wasn’t
 13 suffering from spiraling schedules and inflated budgets like past nuclear construction.²²
 14

15 None of this was relayed to the PSC with anything near the reality that was taking place
 16 behind the scenes. Indeed, rather than acknowledge the severe potential problems of “first-of-a-
 17 kind” project, SCE&G was inclined to depict being first as an advantage in a number of ways.

18 The risk factors related to the Facilities fall into several broad categories. Certain of the
 19 risk factors are risks that are typical of construction projects of the size and complexity of
 20 the Facilities. Others are related to the degree and sensitivity of the regulatory and safety
 21 oversight that are involved in nuclear construction. Still others are related to the fact that
 22 the Units will be among the first new nuclear units sited and built in the United States
 23 since the 1970s and 1980s, and will be among the first of what are anticipated to be a
 24 dozen or more new Westinghouse AP1000 units to be constructed in the United States
 25 and other countries over the next decade.
 26

27 In addition, because the Units will be among the first Westinghouse AP1000 units
 28 anticipated to be constructed in the United States, suppliers, contractors and others in the
 29 industry are expected to have a strong interest in supporting the success of SCE&G’s
 30 construction and permitting process.
 31

32 The Units are also likely to be among the first of a dozen or more new Westinghouse
 33 AP1000 units to be built in the United States. The supply chain for nuclear-grade plant
 34 components has not been supported by new construction for some decades and will need
 35 to be significantly expanded to meet the requirements of this new construction cycle.
 36

²² Andrew Brown, “S.C. utilities knew of big problems into nuclear project but didn’t tell customers,” *Post and Courier*, May 5, 2018, <https://tinyurl.com/yadr3az6>

1 In this context, it is helpful that Units will be built at the leading edge of the cycle, and
2 should have the first call on the suppliers and manufacturing capacity that exist today.
3 Nonetheless, the volume of anticipated nuclear construction around the world may create
4 shortages in this capacity which may lead to increased costs and schedule delays in
5 obtaining key components.
6

7 As one of the first nuclear construction projects anticipated to get underway in the current
8 construction cycle, the SCE&G construction project should have an advantage in
9 attracting the required personnel over projects beginning later.²³
10

11 The contingency fund had failed to cover the bets, the misuse of the escalation savings had failed
12 to cover the bets and the company had every reason to expect things to get worse and worse.
13 Continuing the project under these circumstances was blatantly imprudent and failing to fully
14 inform the PSC was consciously misleading. Whether it was as bad and nefarious as to
15 constitute punishable fraud will be decided by various courts. That it constituted imprudence,
16 established at a much lower measure of proof is, I believe, certain.

17 This list is only part of the story. There were other areas where it can be argued that the
18 utility had less control, for example: technology, marketplace and policy. The fact that it had
19 less control is not an excuse to ignore these risks because the utility must respond to them.
20 Every one of the assumptions it used to justify construction of the reactors proved wrong, long
21 before construction began, undermining even the pretense that nuclear power was economic.

22 The failure of the utility to list these other risks is indicative of a fundamental flaw in its
23 approach to management and prudence review. Under market conditions management must take
24 market, technology and policy risks into account. The ability to produce a good or service at a
25 given cost is only half the challenge. There must also be demand for it, including the question of
26 what the cost (and price) of similar products from other producers would be.

²³ Exhibit J: Risk Factors Related to Construction and Operation of the Facility, Combined Application of South Carolina Electric & Gas Company for a Certificate of Environmental Compatibility and Public Convenience and Necessity and for a Base Load Review Order, Public Service Commission Docket No. 2008-196-E, p. 1.

1 Things grew worse and worse over time, but the utility continued to make erroneous
2 assumptions in an attempt to demonstrate that the project made economic sense for consumers.

3
4 **Q. What are the marketplace risks that the utility ignored in its analysis?**

5 A. From the very beginning it exhibited a baseload bias that blinded it to the possibility that
6 alternatives could provide lower cost power. My client complained about this bias in the initial
7 proceeding, as I did in my 2012 testimony. The utility continued to make this tragic mistake
8 right up until the end. Prudent management cannot look at the world the way it wants to, it has
9 to analyze the world as it is. Try as it might, its fake analysis could not make the reality go
10 away.

11 So, the utility looked at gas as the only alternative it would consider and it did it did not
12 do a very good job of projecting gas prices. Before construction ramped up, the price of gas had
13 fallen by almost two thirds and it has never shown any tendency to increase to the levels that the
14 company had assumed to justify the project. Starting in 2010, even using the utility's baseload
15 bias, the project was not prudent.

16 A second major marketplace risk that the utility ignored was the dramatic decline in
17 demand growth. Not only was there no need within its system for this capacity, but since the
18 reduction in demand growth was pervasive throughout the industry, there was little if any chance
19 it could find customers for it overpriced power.

20 With high costs on the supply-side and no need on the demand side, the only way to keep
21 the project going was to hide the truth, which is exactly that the recent evidence suggests the
22 company did.

1 The utility offered two policies that they thought would help the case of nuclear reactor
2 construction. Both fail miserably.

3 One of the most frequent claims put forward to justify the subsidization of nuclear
4 reactors (old and new) is the claim that they are essential for decarbonization of the electricity
5 sector. As is the case for all things nuclear, they are a brutally inefficient way to achieve that
6 goal. New reactor construction is particularly inefficient at decarbonization because it takes so
7 long. While nuclear reactors are bogged down in the construction phase, alternatives could be
8 online meeting the need for electricity with carbon free resources. Between the carbon-intensive
9 construction process and the long construction period, one quarter of the advantage of nuclear
10 *vis-à-vis* coal is squandered.²⁴ Moreover, nuclear reactors are so large that it makes managing
11 the retirement schedule more difficult. It is also important to note that nuclear power is not an
12 attractive resource when other pollutants are considered.

13 The utility claimed that nuclear would diversify the resource mix away from natural gas.
14 That benefit was entirely a function of the baseload bias and the assumption of unrealistic
15 demand growth. The benefit of diversity is to improve resilience, but huge nuclear units create
16 severe vulnerability to outages. They increase the need for very large reserve margins and large
17 units. The better approach to diversity it to include many smaller units spread across a wide
18 geographic area.

19 Exhibit MNC-5 highlights the fact that many of these issues were raised in the initial
20 testimony on behalf of my client in 2008. I consider this difference in estimation of risk as not a
21 “matter of opinion,” but the difference between prudent and imprudent decision making in a
22 situation that holds the utility to a high standard of prudence.

²⁴ Mark Z. Jacobson, 2009, “Review of Solutions to Global Warming, Air Pollution, and Energy Security.” *Energy and Environmental Science* 2, Table 3.

B. Abandonment

Q. Does the abandonment of the project change your analysis of imprudence?

A. In some ways it does and in others it does not.

On the one hand, it does not alter the fundamental principles of prudence review.

Imprudently incurred costs should not be recovered from ratepayers whether or not the project is completed. On the other hand, abandonment means that the project will not be used and useful.

From the ratepayer point of view, it is pure waste. This raises basic questions and heightens scrutiny. When should the utility have realized that the project would fail and how much was wasted after the ultimate failure could be predicted?

Moreover, abandonment has always altered the way sunk, but wasted costs are recovered, since the project can never be used and useful to provide any benefits to ratepayers. Therefore, the reward enjoyed by stockholders is also reexamined.

Under normal conditions of market competition, the utilities would recover few of the resources they wasted. Under the normal circumstances of utility regulation, there is no doubt that regulators would give close scrutiny to wasted resources and could prevent imprudent costs from being imposed on ratepayers. They could also limit the burden of the recovery of sunk and abandonment costs by lowering the utility's rate of return and shortening the recovery period. The disallowance and reduced earnings are justified because the competitive market, which utility regulation seeks to emulate, does not generally reward failure. While the utility argues that the BLRA perversely assures cost recovery from ratepayers even in the event of project

1 abandonment; the terms of BLRA expressly retain the traditional prudence determinations for the
2 recovery of abandoned project costs.

3 Abandonment would also open the possibility of other means for reducing the burden of
4 sunk costs: of “claw backs” of costs that had been imprudently incurred. It would be possible to
5 reduce the amount of sunk costs for which ratepayers are on the hook. These “claw backs”
6 include reclamation of costs under the bankruptcy laws, capture of the Toshiba parental
7 guarantee for ratepayers, reviewing significant costs approved in the face of imminent
8 abandonment, and revisiting the decision to allow the cost overruns in the first place, given the
9 subsequent evidence of poor analysis, management or utility misconduct.

10 The agreement reached in late 2016 to handsomely compensate the errant vendor,
11 Westinghouse, to accept a so-called ‘fixed-price’ contract is now highly suspect. The vendor was
12 asked for a new work plan and schedule, but failed to deliver one. These costs could be
13 disallowed by the Commission. As of mid-2017, SCE&G had paid Westinghouse about \$1.7
14 billion out of \$4.9 billion of construction costs that had been incurred.²⁵ Thus, there appears to
15 be a large sum of “sunk” costs that have not been paid yet. Given the complete breakdown of
16 project management and the failure to have a realistic plan of operation, the entire increase in
17 sunk costs back to 2008 should be examined.

18
19 **Q. When you say ratepayers receive no benefit from the abandoned project, aren’t you**
20 **overlooking the ratepayer benefit that advanced cost recovery yields by lowering the**
21 **utility’s cost of capital?**

²⁵ Cindi Ross Scoppe, “SC Nuclear debacle, by the Numbers,” *The State*, June 29, 2018,
<https://tinyurl.com/y7q4omae>

1 A. The suggestion that ratepayers are better off because they paid less for a useless and
2 wasteful project is ironic, to say the least, but technically, the financing arrangement lowered the
3 cost of capital the utility paid. However, I have always been skeptical of this argument for two
4 reasons. First, without the shifting of risk to ratepayers with advanced cost recovery, utilities
5 might have been less inclined to undertake wasteful projects. Second, the financial calculation
6 ignores the opportunity cost of consumer capital. Having ratepayers pay earlier robs them of the
7 use of their money. The cost/benefit calculus is more complicated than the simplistic approach
8 taken by the utility. At the end of the day, the abandonment negates any discussion of benefits.
9 The total amount charged to ratepayers is what matters.

10
11 **Q. You are suggesting that abandonment traditionally triggers a broad review of**
12 **prudence. Is that the case with the BLRA?**

13 A The plain language of the statute suggests so to me and counsel informs me that this is
14 the view my client is taking. The language is as follows:

15 SECTION 58-33-280. Requests for approval of revised rates.

16 (K) Where a plant is abandoned after a base load review order approving rate
17 recovery has been issued, the capital costs and AFUDC related to the plant shall
18 nonetheless be recoverable under this article provided that the utility shall bear the
19 burden of proving by a preponderance of the evidence that the decision to
20 abandon construction of the plant was prudent. Without limiting the effect of
21 Section 58-33-275(A), recovery of capital costs and the utility's cost of capital
22 associated with them may be disallowed only to the extent that the failure by the
23 utility to anticipate or avoid the allegedly imprudent costs, or to minimize the
24 magnitude of the costs, was imprudent considering the information available at
25 the time that the utility could have acted to avoid or minimize the costs. The
26 commission shall order the amortization and recovery through rates of the
27 investment in the abandoned plant as part of an order adjusting rates under this
28 article.

1 Abandonment is dealt with in a separate section that clearly distinguishes the
2 abandonment rate proceeding from other, prior, proceedings under the BLRA. Abandonment
3 has several aspects.

4 First, the utility must demonstrate that the abandonment is, itself, prudent. Abandonment
5 was obviously the right thing to do; but at the grossly wrong time - almost ten (10) years too late.

6 Second, independent of prior ratemaking, the PSC is charged with the obligation to
7 assure that ratepayers are charged only costs that have not been imprudently incurred. Moreover,
8 failure to avoid or minimize the costs that are to be recovered from ratepayers can lead to a
9 disallowance.

10 Third, to the extent that recovery of abandoned cost is allowed, the PSC sets the
11 amortization period for the investment in the plant. The term “the investment” without
12 qualification certainly suggests that all investment is to be put under review.

13 Thus, traditional prudence review applies at two points in the overall process. It
14 constitutes the second step in the prudence process in which the PSC engages in an examination
15 of costs for plants that are (or will be) used and useful. It also constitutes a separate proceeding
16 in the event of abandonment.

17 The utility received a number of incentives to undertake the project, including piecemeal
18 review and other positive incentives, but this plain language of the statute did not excuse it from
19 traditional prudence review at key points. I recognize that these issues will be intensely litigated,
20 but I also believe the plain English is clear.

21 First, the 2012 date for abandonment that I advocated would have dramatically reduced
22 the costs that had been sunk in the project. Emerging undisclosed evidence of imprudence and
23 utility misconduct support additional ‘claw backs’ of imprudently incurred project costs. The

difficulties of achieving on-budget and on-schedule construction became apparent in 2010, during the early ramp up. For example, SCE&G's CEO Kevin Marsh chastised Westinghouse management in 2013 that it was

now in its third year of unsuccessful attempts to resolve its (module) manufacturing problems at the (Lake Charles) facility which continue to impact our project negatively. Your missed deadlines put potentially unrecoverable stress on the milestone schedule approved by the SC Public Service Commission. I don't have to remind you that continuing delays and cost overruns are unacceptable from a public perspective and could have serious effects.²⁶

Indeed. The utility's non-disclosure to regulators of the material failure of the critical modular construction approach dates from this earliest period of the project. The utility and its partner's documented recitation of the troubled early history of the project, with emphasis on the failure of module production and multiple design issues as primary sources of project delays, was documented in a detailed demand letter from SCANA and Santee Cooper CEOs to Westinghouse on May 6, 2014.²⁷ That letter noted that "events since May 23, 2008, [signing date for the initial EPC contract] have tested our resolve," at p. 2; asserted in bold, all CAPS, that "**OUR FRUSTRATION CONTINUES TO MOUNT**," p. 13; and concludes by asserting that "the Consortium's unexcused project delays constitute breaches of material provisions of the EPC Agreement." p. 14. Was this material information bearing on the prudence of project management also withheld from the regulators? Finally, an independent third party assessment of the project by Bechtel documented serious mismanagement by both the vendors and the utility, poor construction productivity, seriously lagging construction completion rates, serious problems with engineering constructability, among other problems; all leading to a high probability that the project completion dates would slip as much as 26 and 32 months,

²⁶ E-mail Kevin Marsh to Westinghouse, Subject: Meeting with SCANA and Santee Cooper, 9-5-13, Exhibit MNC-6.

²⁷ Letter SCANA Marsh and Santee Cooper Carter to Asherman CB&I and Roderick Westinghouse, May 6, 2014, MNC-7.

1 respectively, p. 2, beyond the current schedule, imperiling Production Tax Credit eligibility for
2 both units at a loss of over \$2 billion.²⁸ I understand that many of these findings by Bechtel were
3 scrubbed from the final Bechtel Report. None of this critical information bearing on the
4 prudence of project costs and completion was disclosed to the regulators when they were making
5 key regulatory decisions on the project's budget and schedule.

6 Second, the parental guarantee that Toshiba gave to the utility to resolve its
7 mismanagement rightly belongs to the ratepayer, since they are the ones who would bear the cost
8 of mismanagement. If that sum is returned to ratepayers and all post-2012 expenditures are
9 disallowed, the cost imposed on ratepayers would be a few hundred million dollars, and come
10 close to wiping the slate clean compared to the amount the utility has proposed to recover. These
11 alternative remedies are available to the Commission to adopt toward providing deserved
12 ratepayer relief.

13
14 **Q. What is your position on the most recent actions of the legislature dealing with the**
15 **Summer 2 & 3 project?**

16 A. While I recognize that this is another topic that will be intensely litigated my analysis
17 certainly has implications for it and, to the extent that it may affect the decision on the issues of
18 imprudence, I would be foolish not to consider what impact it would have on my analysis and
19 recommendations. The key factors in the legislative action place it well within the framework I
20 have outlined.

21 The PSC is a creature of the legislature.

22 As I show above, I believe that the utility has misinterpreted the statute.

²⁸ E-mail Bechtel Rau to Santee Cooper Crosby, October 13, 2015, MNC-8.

1 The utility has made several proposals to deal with excess costs. The proposal involved
2 in the merger takes a position on how much ratepayers should pay, before and without a
3 thorough prudence review.

4 The action the utility proposes in response to the abandonment decision would make it
5 much harder and more complex to deal with any disallowances, with a new owner in place and
6 the old owners compensated for the assets. The fact that the new owner makes no mention of
7 imprudence and abandonment cost reviews in its filing,²⁹ underscores the legitimacy of this
8 concern.

9 The legislature did not presume an outcome, it preserved the possibility of an outcome by
10 leaving money in ratepayer pockets while the prudence review of excessive and abandonment
11 costs was ongoing, both of which were clearly contemplated in the BLRA.

12 In light of these facts, it is entirely logical for the legislature to seek to cordon off the
13 failed project from ratepayers. If the utility had not enshrined its view of recovery of imprudent
14 and abandonment costs in a major change in ownership, the legislature might have had
15 somewhat less justification for acting, but given the precipitous action of the utility, the urgency
16 for legislative action was great.

17 One might argue that the legislature could have waited to let the prudence review process
18 play out, but the utility certainly did not wait. Threatening bankruptcy, proposing a merger with
19 an out-of-state company based on the inclusion of billions of dollars of recovered costs for
20 an abandoned plant, is the antithesis of waiting. One can certainly argue that the legislative
21 action preserves the space for the treatment of abandonment costs that it laid out in the BLRA. It
22 is not a taking, but a simple effort to protect its original legislative intent from an end-run by the

²⁹ Direct Testimony of Thomas F. Farrell, II, On Behalf of Dominion Energy, Inc. Docket No. 2017-370-E

1 utility. The legislation passed that became law in July 2018 is a logical reaction to the utility's
2 actions.

3
4 **Q. How does the recent court ruling bear on your argument?**

5 A. It is early in the legal process and things could change, but there are several fundamental
6 ways in which it is consistent with my analysis in rejecting the constitutional, takings challenges
7 to the law. First, it notes that the PSC is a creature of the legislature. Second, it observes that we
8 are midstream in a process, so the complaint is premature. Third, it finds that the process will
9 determine the substance of whether the utility's rates will be reduced, which is a matter of
10 prudence under the utility statute. Fourth, utility law applies standards that are broad and
11 flexible in striking a balance between utility stockholder returns and charges placed on ratepayer.

12
13 **Q. Is the utility's abandonment defense an example of the "to-go" scam?**

14 A. Yes. It is one of the worst examples imaginable. If pigs could fly, the construction of
15 Summer Units 2 & 3 would have been economic, but they cannot. The utility bought the pig, fed
16 it almost \$5 billion, about 80% of the original cost estimate, and wants to collect billions of
17 dollars with interest, even though they now say it is inedible and ratepayer won't get even one
18 slice of bacon. Utility stockholders will get some flesh to feast on, not from the pig, but from the
19 hide of the ratepayers.

20 That the company now finds the reactor uneconomic and needs to be abandoned is not
21 surprising, since I showed in 2012 that it was uneconomic and should be abandoned and my
22 client argued in 2008 much the same. What is surprising is the effort to insist that it made
23 economic sense to start and pump money into the project for a decade. At key past decision

1 points, it should have been clear to a prudent decision maker that the plant should be abandoned,
2 but the utility kept signing new agreements, in 2008, 2012, and 2016, accepting higher costs in
3 spite of clear evidence that the prudent course of action would be to abandon the project.

4 The flip-flop between 2016 and 2017 is jolting, but was inevitable. It appears that the
5 vendor did not have a credible, executable schedule for at least eight years. Worse still, the utility
6 never fully informed the regulator of the intense problems of the construction process, even
7 though its internal documents now indicate just how bad things were.

8 The most recent economic analysis is more a regurgitation of past mistakes than anything
9 else. The utility insists that “if” things had gone as its probabilistic projections had gone in 2008,
10 2012, and 2016, it was prudent to continue. Unfortunately for the utility, the construction of new
11 nuclear reactors did not exist in the fantasy world the utility created, it must exist in the real
12 world. The assumptions needed to support the utility’s conclusion were totally unrealistic and
13 imprudent. The chances that the utility’s analysis was correct were slim to none and no prudent
14 decision makers would have bet their company against such odds.

15 It now turns out that in order to maintain the fiction of prudence, the utility had to hide
16 the facts from the Commission and ultimately cook the books. Any earlier decisions finding the
17 construction to be prudent are undermined by this misrepresentation of the chaos that afflicted
18 the project from the outset, but the decision themselves were undermined by mismanagement of
19 the project, misunderstanding of the economic reality in the electricity sector, and
20 misinterpretation of the BLRA.

21
22 **Q. How pervasive were the flaws in the utility’s analysis?**

1 A. The breadth and depth of the errors was remarkable. It is not just one assumption that the
2 utility made in contradiction of the clear real-world evidence, every assumption went wrong,
3 from the beginning of the project. The utility has repeated all of the mistakes we pointed out in
4 our 2012 testimony and which were identified in Friends of the Earth's 2008 testimony. Rather
5 than simply repeat my demonstration that each of the prior conclusions was wrong, I will focus
6 on the major errors that the utility made early and simply repeated over and over again, as Dr.
7 Lynch's testimony in this proceeding shows.

8 The first big, repeated error was rising construction costs. The utility never got control of
9 costs. The farther the project advanced in the construction phase, the more rapid the cost
10 overruns became, repeating the historical pattern that plagued the nuclear power industry
11 throughout its 50-year history of commercial construction in the U.S. From 2012, when my
12 testimony showed that the reactors were already uneconomic and should be abandoned, until
13 2017, when they finally were abandoned, the projected costs increased by at least 50 percent. In
14 the abandonment application the utility concluded that the cost of the project would be \$1.1
15 billion higher (net of the Toshiba parental guarantee) than the fixed price it had agreed to. It was
16 admitting more execution risk just a year after accepting a lower cost. As Exhibit MNC-9
17 shows, the historic pattern of continually rising cost over the course of the construction phase
18 was not (or should not have been) news to the utility. That was the historic pattern and that was
19 the problem the utility quickly faced, but failed to control.

20 The second big repeated error is natural gas price estimates. Lynch notes that the 2008
21 projection for natural gas in 2018 was over 450% higher than the observed prices. Having noted
22 this remarkable misestimation of gas prices, he goes on to point out the current gas price plus
23 50%, which has consistently been the utility's preferred (and grossly overestimated) preference.

1 Exhibit MNC-10 shows that the “plus 50%” estimate is well over 50% higher than the current
2 future price of gas. The utility never got gas prices right because its analysis collapses with
3 realistic prices.

4 The third big, repeated error is the overestimation of demand. The utility continues to
5 project demand growth that is far above what has been observed since the project was proposed.
6 As shown in Exhibit MNC-11, the construction of the reactor is pure waste, when realistic
7 growth is assumed.

8 The fourth big repeated error is the failure to give full consideration to efficiency and
9 renewables. The utility continues its baseload bias. Efficiency and renewables are an
10 afterthought and a nuisance. As shown in the upper graph of Exhibit MNC-12, the cost of
11 alternatives has plummeted, while the cost of nuclear has skyrocketed. The utility never
12 incorporated the potential for renewables into its analysis. As shown in lower graph of Exhibit
13 MNC-13, the utility model assumes that the nuclear reactors crowd out the alternatives. The
14 addition of solar power ceases, as does firm purchased power, when the reactor enters the
15 resource portfolio, in spite of the fact that these alternatives are much less costly.³⁰ Efficiency
16 and DSM limp along, far below what can be achieved and has been in other states.

17 Thus, the marketplace and technology risks that argued against the project continue to do
18 so, but the utility continually ignored them.

19 Its judgment on the other risks, once again, proved to be faulty.

20 Its judgment on the price of carbon was also off the mark. The U.S. has imposed no price
21 on carbon as policy. Perhaps there should be one, but even if there were, nuclear reactor
22 construction is the most expensive way to decarbonize the sector. As shown in Exhibit MNC-14,

³⁰ Direct Testimony of William M. Cox, Phd on Behalf of Georgia Interfaith Power and Light Partnership for Southern Equity, before the Georgia Public Service Commission, December 1, 2017, included purchased power agreement and found much lower costs for the alternative scenario.

1 which summarizes the most recent calculation of a well-respected independent analyst how has
2 been providing consistent analyses since the first days of the Summer project, nuclear is an
3 extremely expensive approach to carbon abatement.

4 Thus, we can draw a direct line explaining the imprudence of this project from its
5 inception to its abandonment with reference to the risk factors that the utility misunderstood and
6 its mismanagement of a complex project. The suggestion that the project had to be abandoned
7 because Santee Cooper pulled out is absurd. Santee Cooper pulled out because the project made
8 no sense. They recognized that the pig could not fly first and that they could not any further shift
9 the cost of failure onto ratepayers in order to protect the owners of the project, since the
10 ratepayers and owners are one and the same.

11
12 **Q. What is the “To-Go” Scam and how does it affect the examination of prudence?**

13 A. The “to-go” scam is a policy game that tries to show that net of sunk costs, it is best to
14 continue the project. This is a process in which utilities waste billions of dollars but come to the
15 commission promising to hold the line on costs. If they do, they claim the remaining costs on the
16 reactor (the “to-go” costs) are less than they cost of switching to an alternative. Of course, they
17 never hold to their cost estimates so the whole exercise was scam. In the case of SCE&G the
18 numerous, erroneous and unsupportable assumptions used cast further doubt on the exercise.

19 In my direct testimony in 2012, I noted that “time is of the essence.” Because of the
20 structure of the BLRA, the longer the utility delays in accepting the fact that the nuclear reactors
21 are no longer the least cost option, the heavier the uneconomic burden that will be placed on
22 ratepayers and the state economy. Under the BLRA, the utility can charge ahead and complete
23 the project in spite of the fact that it is not economic and there is nothing the Commission can do
24 to stop it from recovering the costs approved up to the original cost (with inflation adjustments).

1 The only thing it can do to protect the ratepayers from harm, is require the utility to do the proper
 2 economic analysis and reject the recovery of cost overruns, since increasing the cost of a project
 3 that is already not economic is the height of imprudence. In a sense, the BLRA is no different
 4 than the long history of cost overruns in the nuclear industry.

5 In the 1970s and 1980s, utilities signed cost-plus EPC contracts and discovered that
 6 schedules were slipping and costs were rising.³¹ They would go to utility regulators and lowball
 7 future costs, so they could argue that the combination of sunk and future costs of continuing
 8 construction were lower than abandoning a given project and pursuing an alternative. Shortly (a
 9 year or two later), they would return to the regulator and claim that costs had escalated. Again,
 10 they would project another modest increase in costs which, combined with the new higher level
 11 of sunk costs, would still be less than the cost of alternatives. By repeatedly underestimating “to-
 12 go” costs, they could keep the project going and justify ever increasing levels of uneconomic
 13 sunk costs. Eventually, the costs rose so high that utility commissions shifted the risk of future
 14 cost overruns onto utilities. Nuclear construction came to a halt.

15 Exhibit MNC-15 shows how brutal the “to-go” scam was for ratepayers. It shows sunk
 16 and “to-go” costs at the key decision points. At year end 2012, when the utility asked for a cost
 17 increase, it had sunk about \$2 billion and claimed about \$3.8 billion more to go. Four years
 18 later, when it inked the fixed price contract with the vendor, it had sunk about \$4.6 billion and
 19 claimed about \$3 billion more “to go.” In other words, while \$2.6 billion was spent, the “to go”
 20 costs came down only \$0.8 billion. From the ratepayer point of view, 70% of the expenditures

³¹ Mark Cooper, "On Behalf of Mississippi Legal Services Coalition in the Matter of the Citation to Show Cause Why the Mississippi Power and Light Company and Middle South Energy Should not Adhere to the Representation Relied Upon by the Mississippi Public Service Commission in Determining the Need and Economic Justification for Additional Generating Capacity in the Form of A Rehearing on Certification of the Grand Gulf Nuclear Project," Before the Mississippi Public Service Commission, Docket No. U-4387, August 13, 1984.

1 had been wasted, since it did not represent progress toward the final goal. About a year later,
 2 when the company again made a big decision, this time to abandon the project, another couple
 3 hundred million had been spent, but the utility now projected final costs would be about \$1.1
 4 billion more than thought at the signing of the fixed price contract. At that point, with the
 5 increase in sunk costs approaching \$3 billion, the “to go” costs were higher than they were in
 6 2012. Ratepayers had lost ground. Toshiba already recognized that the project was beyond its
 7 means to complete under the contract and it exited, and for good reason. The history of nuclear
 8 power and the history of the project provided powerful evidence that the cost escalation was far
 9 from done. In fact, just a year after taking the Vogtle project over, Southern Company
 10 announced that its costs had already increased by an amount equal to the sum SCE&G had added
 11 to its cost estimate.³²

12 Thus, there was a sixth, repeated error in the utility’s analysis: it kept assuming the
 13 recovery of sunk costs by imposing them on the gas scenario.

14
 15 **Q. What is your expert opinion of the proper regulatory treatment of the utility’s**
 16 **proposed abandoned project cost recovery application?**

17 In my professional opinion, for the reasons I have set out in my testimony here and in
 18 2012, all of the costs incurred by the utility for the abandoned nuclear project should be
 19 disallowed as imprudent pursuant to the BLRA and generally accepted principles of utility
 20 regulation.

21 To blend phrases from the 1985 *Forbes* and the 2017 *Engineering News-Record* “only
 22 the blind, or the biased, can now think” that the cost overruns are done, or that the power from

³² Anastachia Ondieki, “Vogtle costs to go up by \$1.1 billion, Georgia Power say,” *Atlanta Journal Constitution*, August 9, 2018, <https://tinyurl.com/ybvncnep>

1 these new reactors will be anything but a huge economic “disaster” and a management “fiasco.”
2 In fact, the history of nuclear power and the history of the project were powerful evidence that
3 the project certainly should have been abandoned in 2012, when I recommended as much. Had
4 the utility described the reality on the ground at that time, the PSC could well have pulled the
5 plug. Indeed, given the very early facts on the ground and the clear history, it can well be argued
6 that signing the EPC was imprudent, which my client argued in 2008 when the utility put it
7 before the PSC.

8 Throughout this period, the company made unrealistic assumption to keep the project
9 going and keep sinking costs by misestimating the “to go” costs. If it recognized that it had
10 failed to get control of costs, the uneconomic reality would have been clear. If it used realistic
11 gas prices the uneconomic reality would have been clear. If it had used realistic estimates of
12 demand, the uneconomic reality would have been clear. If it had given full consideration to the
13 alternatives, the uneconomic reality would have been clear. If it had admitted that there was no
14 tax on carbon, or policy to impose the social cost of carbon, the uneconomic reality would have
15 been clear, and even if there was one, nuclear reactor construction was the most expensive and
16 dirtiest way to respond. If it had not imposed the sunk costs on gas, the uneconomic reality
17 would have been clear.

18 As I showed in my 2012 analysis of the utility’s original decision to undertake the project
19 and in my dismantling of their 2012 analysis, introduction any one of these realities into the
20 analysis would have dictated abandonment. Taken together, they are a monumental failure and
21 constitute massive imprudence. If the truth of the chaos of the project had been revealed, the
22 prior prudence reviews might well have come out differently and the abandonment decision
23 opens the entire history to scrutiny.